

The different forms of the sori are technically designated as first, *linear*, or straight (*asplenoid*); second *hamate*, i. e., like a Bishop's crook, or staff, and third *hippocrepiform*, in shape like a horseshoe, the two latter forms being *athyrioid* in character.

All three of these forms occur in greater or less proportions on the same plant, and even on the same frond, but the hamate and hippocrepiform sori occur in greater proportion on some forms than on others, and it was the preponderance of such forms that led Roth to found the genus.

From all this it will be seen that *Athyrium* is chiefly characterized by the production of *hamate* and *hippocrepiform* sori, and that *Athyrium filix-foemina* is its best type.

The only other member of the genus in New England is *Athyrium thelypteroides*, Desvaux, which may be the subject of another note later on.

MEDFORD, MASSACHUSETTS.

THE NORTH AMERICAN EUPHRASIAS.

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It has long been recognized by New England botanists that the attractive little Eyebrights of our northern borders present much more diversity than is indicated in current floras. The appearance of Prof. von Wettstein's elaborate monograph of the genus *Euphrasia*, published in 1896, was, therefore, a matter of much interest and many efforts have been made to bring our forms under the species of the New and Old World therein so carefully described. However, the results have been only partially successful. It is true that the separation of *E. latifolia* of arctic America and the specific distinction of the diminutive *E. Oakesii* of the White Mountains have given some relief to the traditional and overcrowded *E. officinalis*, but even with the addition of *E. americana*, Wettst. and the later *E. canadensis*, Townsend, it has still been impossible to find satisfactory categories for several of our forms. This has arisen from no lack of clearness in the detailed descriptions and excellent key of the monograph but from the evident fact that its author, while able to examine a great

wealth of Old World material was obliged to draw his inferences regarding the American species from comparatively few and inadequate specimens. During last August the writer in company with Mr. E. F. Williams was able to secure on Mt. Washington specimens of the alpine forms there represented and these together with excellent material from the St. John valley in northern Maine, some very interesting forms from Mt. Desert Island secured by E. L. Rand, Esq., and the miscellaneous specimens which have long been accumulating in the Gray Herbarium, have seemed to warrant the present attempt to coördinate our American forms. It must be confessed, however, that the present restricted range of several species, the nearness of others to Old World forms, and the difficulty of clearly delimiting the arctic species, all suggest the probability that considerable further collecting and observation will be necessary before a definite settlement of the group can be attained.

According to Wettstein's treatment the genus *Euphrasia* contains about 90 species, of which 19 are Australian, 14 South American, and the remainder of the northern temperate and arctic zones, occurring chiefly in mountainous and boreal regions. Wettstein regards the following species as exclusively American: *E. Oakesii* and *E. americana*, to which may be added the later published *E. canadensis*, Townsend,—while *E. latifolia*, and *E. mollis* are treated in the monograph as common to certain portions of both continents. The possible occurrence of *E. hirtella* in America as merely conjectured. All these species are annuals and belong to Wettstein's first series, the *Parviflorae*, which includes also the majority of the rather numerous and difficult species of central Europe and the British Isles.

SYNOPSIS OF SPECIES.

* Flowers very small, borne in a compact leafy head or very short dense subcapitate raceme: dwarf arctic and alpine species with stems normally simple: corolla dorsally 3 to 4 mm. long.

+ Leaves gray pubescent beneath.

+ Calyx-teeth straight or nearly so: flowers shortly racemose: Alaskan.

E. MOLLIS, Wettstein, Monog. d. Gatt. *Euphrasia*, 141 t. 4, f. 205–210, t. 12, f. 5 (1896). *E. officinalis*, var. *mollis*, Ledeb. Fl. Ross. iii. 263 (1849). Leaves gray-hirsute upon both surfaces, especially upon the nerves beneath, the lower ovate, deeply crenate-toothed,

the upper and floral suborbicular with obtuse, obtusish, or scarcely acute teeth: calyx-teeth rather broad, flat, subacute, densely pubescent: corolla very small, white or purple with deeper-colored veins.—Alaska, the Aleutian Ids., and Kamtchatka acc. to Wettstein. To this species may be referred Mr. J. M. Macoun's no. 154 from Behring Isl. The species seems difficult to separate satisfactorily from *E. latifolia*, Pursh. The latter, however, is less hirsute, often glandular, more inclined to branch, and has slightly larger flowers.

++ ++ Calyx-teeth recurved: flowers capitate: corolla white with violet veins and yellow eye: White Mountains of New Hampshire, and (?) Mt. Katahdin, Maine.

E. OAKESII, Wettst. l. c. 142, t. 4, f. 211 to 215, t. 12, f. 6, & in Bot. Gaz. xxii. 401; Britton & Brown, Illust. Fl. iii. 182, f. 3327 (excellent). *E. officinalis*, var. *tatarica*, Wats. & Coult. in Gray, Man. ed. 6, 392, in part. Very dwarf, 2 to 5 cm. high, the filiform erect or often decumbent simple stem bearing 1 to 4 pairs of small ovate-orbicular leaves below the dense globular leafy inflorescence (about 1 cm. in diameter): leaves and bracts finely pubescent upon both surfaces, the teeth 5 to 9, very blunt and separated by rounded sinuses: calyx pubescent, the teeth slightly indurated, curved outward in varying degrees or even reflexed: corolla so small as to be inconspicuous even in anthesis, nearly or quite white, marked with deep bluish violet veins and yellow eye.—Alpine region of the White Mountains, *Oakes*; *W. H. Manning*, 9 Aug. 1881; along the Crawford trail, near the head of Oakes Gulf and Mt. Munroe, 28 Aug. 1877, and 18 Sept. 1891, *E. Faxon*, 20 Aug. 1891, 31 July, 1893, *G. G. Kennedy*, also in the same locality, 4 Aug. 1901, *E. F. Williams* & *B. L. Robinson*. Growing in abundance in dry stony soil with *Potentilla frigida*, etc. While it is not possible to say with certainty that the locality particularly mentioned, which is on the western side of Mt. Washington toward Mt. Monroe is the one in which the original material was obtained by Oakes, it is now the only locality where this plant is known to grow in the White Mountains and it is altogether likely that it is the type station. Immature and doubtful plants apparently of this species were collected on Mt. Katahdin, altitude 1225 to 1375 m., 14 July, 1900, by M. L. Fernald (RHODORA, iii. 176).

+ + Leaves more or less ciliolate and minutely setulose upon the upper surface near the margin (under a lens), otherwise essentially glabrous: corolla brownish purple with a yellow eye.

E. Williamsii. Dwarf, 3 to 10 cm. high; stem erect, simple, filiform, purplish, covered with short crisped white hairs and bearing beneath the terminal dense leafy head 3 to 5 pairs of leaves: leaves green with slight bronze tinge above, 5 to 8 mm. long, ciliolate, otherwise essentially glabrous, the lowest ovate-oblong, 7-toothed,

the middle somewhat larger, ovate, the floral obovate to flabelliform or suborbicular, closely approximated in a dense head; teeth 7 to 9, short, triangular, acutish, the terminal tooth of each floral leaf broader and more obtuse but mucronulate; the sinuses acute or at least not conspicuously rounded: flowers very small, confined to the terminal subglobose head and one or two of the upper axils just beneath it: calyx 4 mm. long, the teeth lanceolate, ciliolate with very short and inconspicuous hairs and terminating in a narrow somewhat uncinuate point: corolla brownish purple, 3.5 to 4 mm. long dorsally, its pubescence minute and visible only with a strong lens; lips about equal in length, the lower paler in color and internally marked by a small yellow eye: capsule elliptical, ciliate toward the obcordate summit, otherwise glabrous.— Eastern slopes of Mt. Washington, New Hampshire, alpine region, stony ground and crevices of rock on the "Alpine Garden" at the head of Raymond's Ravine and of Huntington Ravine, 5 Aug. 1901, *E. F. Williams & B. L. Robinson* (type); ledges near the 5th mile post on the spur known as "Cape Horn," 6 Aug. 1896, *E. Faxon & E. F. Williams*; at the same locality 6 Aug. 1901, *E. F. Williams & B. L. Robinson*.

This species possesses a close habital similarity to the preceding and in the dried state might easily be confused with it, unless the very different pubescence were noticed. In a fresh state, however, the deep brownish purple corolla and greener foliage readily distinguish it from *E. Oakesii*. There are also minor differences in the sinuses between the teeth of the leaves, smoother less uncinuate calyx-teeth, etc. Mr. Williams and the author examined about six hundred individuals of this species and more than a thousand of *E. Oakesii*, but could detect no intermediates.

* * Flowers very small (corolla 3 to 4 mm. long), borne in long open racemes; stems simple or few-branched: leaves small, bluntly toothed, pubescent on the veins beneath.

E. Randii. Simple or few-branched from near the base or (rarely) much branched throughout, erect or decumbent, 3 to 12 cm. high; stem purple, covered with very short recurved white hairs and bearing 10 to 13 pairs of leaves (separated by short internodes of nearly uniform length) and a small terminal dense leafy head: leaves suborbicular, 9-11-toothed, the larger 7 to 9 mm. long, broadly subcordate, finely subappressed-pubescent upon the dark green rugose upper surface, setulose upon the prominent veins of the paler lower surface, the teeth obtuse or barely acute, not aristate, all pairs of leaves, except one or two of the lowest floriferous in one or both axils: flowers small, subsessile: calyx pubescent, 3.5 mm. long; the teeth triangular, lanceolate, flattish and nearly or quite straight, finely pubescent upon both surfaces: corolla cream-colored with reddish veins to deep purple or violet, marked with still deeper veins, greenish toward the base, nearly glabrous; lips short, about equal:

capsule elliptic-oblong, ciliate and obcordate at the summit.—Grassy and sedgy places on Mt. Desert Island, Maine, and the smaller islands adjacent, as follows: Great Cranberry Isle, 17 July, 1897, *E. L. Rand* (types, in hb. Gray and hb. *E. L. Rand*), 17 July, 1896, *E. L. Rand*, 20 July, 1899, *E. L. Rand* & *E. F. Williams*; Mt. Desert Isl., on the "Sea Wall," 26 July, 1892, *E. L. Rand*; Baker Isl., 22 July, 1899, 22 July, 1901, *E. L. Rand*; Great Duck Isl., 12 July, 1901, *E. L. Rand*; near seashore, Cutler, Maine, 13 July, 1901, *G. G. Kennedy*.

This species differs from *E. Oakesii* in its greater stature, tendency to branch, broader and straightish calyx-teeth, apparently deeper colored corolla, and especially in the open spicate raceme, which begins from the second or third node and is much elongated even during anthesis. In *E. Oakesii* on the contrary the inflorescence remains capitate even to ripe fruit. *E. Randii* differs from *E. Williamsii* similarly in inflorescence and also in its much more copious pubescence. It appears to stand close to *E. micrantha*, Brenn. of Lapland, which, however, is said to have a glabrate calyx and white corolla with dark veins.

VAR. (?) **Farlowii**. Leaves smaller, 2 to 4 mm. long, thicker, only 5-7-toothed: pubescence coarser and more spreading.—Dog Island, Eastport, Maine, September, 1877, *W. G. Farlow*. This is a puzzling form which more copious material may show to be a distinct species.

* * * Flowers larger: corolla dorsally 5 to 7 mm. long, white with bluish purple or violet veins and yellow eye.

+ Leaves conspicuously pubescent, glandular hairs being often interspersed with the non-glandular; teeth obtuse to acute (in the upper and floral), not at all aristate or scarcely so.

E. LATIFOLIA, Pursh, Fl. Am. Sept., ii. 430 (1814); Wettst. Monog. 136, 298, t. 4, f. 194-199, t. 11, f. 11. 12; not Willd.; *E. officinalis*, var. *latifolia*, Britton, Mem. Torr. Club, v. 296 (1894), and *E. latifolia* Britton & Brown, Illust. Fl. iii. 181, 182 (but fig. 3325 uncharacteristic and name contrary to the Rochester Code); *E. officinalis*, var. *tatarica*, Benth. in DC. Prodr. x. 552, in part.—Dwarf or rarely tall, 4 to 12 (or more) cm. high: foliar leaves 2 to 4 pairs, broadly ovate, obtuse and with 2 to 5 bluntish teeth on each side, pubescent with (for the genus) rather long although often sparse non-glandular hairs; floral leaves larger, more deeply and sharply toothed but not aristate, commonly glandular as well as covered by a rather copious non-glandular pubescence, not plicate even in dried specimens: flowers closely aggregated at the ends of the stem, but the inflorescence at length becoming lax below.—Northern Maine, upper St. John valley, *G. L. Goodale*. Labrador, Hopedale, Bowdoin Coll. Exped. no. 242, also *J. D. Sornborger*, no. 82; Rama, *A. Stecker*, no. 343; also Alaska, Kamtchatka, and Lapland, *Andersson*.

E. HIRTELLA, Jordan in Reuter, Compt. Rend. Soc. Haller. iv. 120 (1854-1856), acc. to Wettst. Monog. 175, t. 4, f. 278-290, t. 8, f. 4-7. — Very similar to the preceding but less arctic in habitat and less dwarfed in habit, 5 to 18 cm. high, often branched: stem-leaves ovate-oblong, cuneate, obtusely toothed; bracts ovate, very sharply or acuminately 5-8-toothed on each side, narrower and less imbricated than in the preceding, strongly pubescent and glandular: calyx, corolla, and capsule much as in the preceding. — North shore of Lake Superior, 1848, *L. Agassiz*, 1879, *T. S. Roberts*; Isle Royal, 1849, *Whitney*; Good Harbor, Minnesota, 14 August, 1868, *H. Gillman*; Hudson Bay, *Burke*; Rocky Mountains of British America, *Drummond*.

While Wettstein credits this species to America doubtfully and only upon the basis of some mixed material in the herbarium of the Royal Gardens at Berlin, there can be little doubt of the entire correctness of his view for the specimens above cited agree well not only with descriptions and figures of *E. hirtella* but also with Old World specimens of it.

On page 191 of his monograph Wettstein cites *E. Rostkoviana*, Hayne, as examined from Quebec (*Canby*), but as this occurrence is not mentioned in his later list of American species (Bot. Gaz. xxii. 401), it is probable that it rested upon a determination which was doubted or latered in the interim. The writer has seen no plant from any part of America which combined the large corolla and copious pubescence which are together characteristic of *E. Rostkoviana*.

+ + Leaves glabrous or bearing only some very minute hairs at the margin and on the veins beneath, the floral bracts often minutely glandular-puberulent.

E. AMERICANA, Wettst. Monog. 127 (1896); Bot. Gaz. xxii. 401. — Rather tall, considerably branched above, the stem covered with fine short crisped reflexed white hairs, the branches elongating into rather loose spicate-racemose inflorescences: lower and middle leaves ovate or ovate-oblong, not strongly plicate, 3-5-toothed on each side, the upper teeth obtuse, the lower acute, becoming in the upper and floral leaves very sharp and decidedly aristate at the tip; more or less fine glandular puberulence often present: corolla 5 to 6 mm. long dorsally. — QUEBEC, *Canby*, acc. to Wettstein: NOVA SCOTIA, Cape Breton Isl., *W. Faxon*: NEW BRUNSWICK, St. John, *Matthew*, acc. to Wettstein; Lily Lake, St. John, 8 August, 1873, *Wm. Boott*; Campobello, September, 1898, *W. G. Farlow*: MAINE, Machias, *J. W. Chickering*; Machiasport, *M. A. Barber*; mossy roadside in woods, Cutler, 16 July, 1901, *G. G. Kennedy*; Mt. Desert Isl., Southwest Harbor, 15 Aug., 1888, 30 Aug., 1890, 28 Aug., 1891, 26 July, 1892, *E. L. Rand*; 19 Sept., 1892, *M. L. Fernald*; Great Cranberry Isle., 20 Aug., 1888, 18 July, 1894, 17 July, 1896, 17 July, 1897, 16 July,

1898, *E. L. Rand*; 10 July, 1894, *E. Faxon*; 7 July, 1890, *J. H. Redfield*, *E. F. Williams*; 20 July, 1899, *E. F. Williams*; Black Isl., 20 July, 1894, *J. H. Redfield*. These plants of Mt. Desert are in many instances tall forms, growing in long grass, branching above, and with inflorescences at first short-cylindric and compact but at length loose and considerably elongated. Complete transitions may be found to the following variety or form growing in short grass or in drier and more sterile places.

Var. *canadensis*. *E. canadensis*, Townsend, Journ. Bot. xxvii, 1, t. 381 (1898).—Closely similar in foliage and flowers: stem low, branched from near the base, densely floriferous from considerably below the middle: floral bracts sometimes with and sometimes destitute of minute glandular pubescence.—QUEBEC, on grassy hills near the city, 1891, *F. Townsend*; Plains of Abraham, *J. Blake*: Ha Ha Bay, *G. G. Kennedy*: MAINE, in short grass, Frenchville, 12 Aug., 1901, *E. F. Williams*, *M. L. Fernald* & *B. L. Robinson*; Great Duck Isl., 9 Aug., 1893, *J. H. Redfield*, 12 July, 1901, *E. L. Rand*; Baker Isl., 22 July, 1901, *E. L. Rand*; NEW HAMPSHIRE, White Mountains, at lower altitudes, Glen House, 28 July, 1865, *Wm. Boott*; 18 July, 1891, *G. G. Kennedy*; roadsides at base of Mt. Washington 10 Aug., 1878, *J. A. Allen*. The White Mountain plants are slender forms of sterile soil.

GRAY HERBARIUM.

SOLANUM ROSTRATUM IN CENTRAL MAINE.—I note that all published records of the occurrence of *Solanum rostratum* Dunal in this State are from the other side of the Kennebec River, or at least I have seen no record of its occurrence nearer than Gardiner. To-day (Sept. 22, 1901) I collected specimens of this species in the rear of some farm buildings a short distance out of Bangor. This species seems to be becoming established throughout the State as it has spread widely since first found in 1896.

I have in my collection at present a fragment of a specimen which was sent to the University of Maine for identification in Sept., 1896, by Mr. C. C. Call of Buxton. I feel sure this was the first instance of its occurrence in the State being known, and record was made at the time by the late Prof. Harvey.—O. W. KNIGHT, Bangor, Maine.